

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	CIOFFI <i>et al.</i>	Examiner:	Dmitry Levitan
Serial No.:	10/692,297	Group Art Unit:	2616
Filed:	October 23, 2003	Docket No.:	STFD.060PA (S02-085)
Title:	CONCURRENT FREQUENCY-SHARING MULTI-USER COMMUNICATION SYSTEM WITH RATE ALLOCATION APPROACH		

REPLY BRIEF

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Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Customer No. 40581

Dear Sir:

This Reply Brief is submitted pursuant to 37 C.F.R. § 41.41(a)(1) for the above-referenced patent application. On June 2, 2008, the Examiner provided an Examiner's Answer to Appellant's Appeal Brief filed on May 12, 2008, in support of the Notice of Appeal filed on January 11, 2008, and in response to the final rejections of claims 1-25 as set forth in the Final Office Action dated October 11, 2007. This Reply Brief is intended to supplement the Appeal Brief of May 12, 2008. All groupings of claims and arguments presented in the Appeal Brief are therefore maintained.

No fee should be required for the timely filing of this Reply Brief. However, if deemed necessary, authorization is given to charge/credit Deposit Account number 50-0996 (STFD.060PA) for all required fees/overages.

Status of Claims

Claims 1-25 stand rejected and are presented for appeal.

Grounds of Rejection as presented in Appeal Brief

1. Claims 1-25 stand rejected under 35 U.S.C. § 112, first paragraph;
2. Claims 1-25 stand rejected under 35 U.S.C. § 112, second paragraph;
3. Claims 1, 3-4, 6-7, 10, 15-18, 20-21 and 23-25 stand rejected under 35 U.S.C. § 103(a) over Zehavi *et al.* (U.S. Patent No. 6,005,855);
4. Claims 5, 12, 14 and 22 stand rejected under 35 U.S.C. § 103(a) over Zehavi in further view of Admitted Prior Art; and
5. The drawings stand objected to under 37 C.F.R. § 1.84(p)(5).

Appellant's Reply Argument

The Objection to the Figures is Improper Because Unfairness Shows Improvement in Rate Allocation

Appellant reiterates that the objection the Figures appears to rely upon reasoning taken from M.P.E.P. § 2145 (disclosed advantage) which relates to 35 U.S.C. § 103, and thus, the following response has been presented in an abundance of caution. The crux of the matter is a portion of Appellant's specification that states "as shown in Figure 2, the resulting rate allocation is significantly better than equal rate allocation", which the Examiner erroneously states is not supported by FIG. 2. FIG. 2 shows unfairness and the skilled artisan would recognize (as taught by Appellant's specification) that an improvement in unfairness shows an improvement in rate allocation. It is undisputed that unfairness is derived from rate allocation and that an improvement in unfairness shows an improvement in rate allocation.

Appellant respectfully submits that the Examiner has not addressed the substance of Appellant's remarks. The Examiner's objection is a conclusory statement that FIG. 2 does not show improvement in rate allocation. As previously stated, FIG. 2 shows degree of unfairness, which is taught by Appellant's specification, to be based upon rate allocations. In

a specific example, unfairness (U) is determined as a function of the rate allocation (R_{\max} or R_{\min}): $U \stackrel{\text{def}}{=} \frac{R_{\max}}{R_{\min}}$. R_{\max} and R_{\min} relate to rate allocations. Thus, the overall rate allocation improves as the unfairness improves. Appellant again states the undisputed contention that FIG. 2 shows an improvement in rate allocations because it shows an improvement in unfairness. As the Examiner has not presented any evidence to the contrary, Appellant respectfully submits that there is nothing in the record that supports the Examiner's erroneous assertion that FIG. 2 does not show improvement in rate allocation.

The Section 112 Rejections are Improper

The Claimed Function is Supported by Appellant's Specification

The Examiner's Answer, for the first time of record, acknowledges that the elements of the claims are understood. Appellant appreciates the Examiner's attempt to clarify that which the Examiner does not understand, but respectfully submits that the Examiner has not met the initial burden of overcoming the strong presumption of support required to be afforded to Appellant. In particular, the Examiner does not appear to have performed a thorough reading and evaluation of the content of the application nor has the Examiner presented evidence or reasons why a person skilled in the art would not recognize that the written description of the invention provides support for the claims.¹ The Examiner's attempt at clarification simply concludes that "describing the function elements/variables is not sufficient to disclose the function of adjusting rates." See Examiner's Answer at page 10. Notwithstanding the lack of analysis by the Examiner, the cited portions of Appellant's specification provide explicit support for varying user transmission rates based upon and as a function of the elements as claimed. Appellant reiterates that the Examiner should have afforded a strong presumption of support to Appellant and that any rejection should include evidence or reasons why the skilled artisan would not find support. The following discussion shows such support and is derived directly from the previously identified portion of

¹ The record provides ample support that the Examiner has not thoroughly read and evaluated Appellant's specification including the Examiner's use of conclusory statements, apparent misunderstandings (e.g., not understanding that unfairness relates to rate allocation and failing to identify numerous teachings relating to a power vector) and failure to address Appellant's arguments.

Appellant's specification (pages 10-11). These previously cited, reproduced and explained portions of Appellant's specification provide sufficient support for the claim limitations, and more specifically, for adjusting rates as a function of the claimed elements.

The steps disclosed in Appellant's specification teach that an individual user's transmission-rate is increased by a set step size. For each step increase, the power setting of each user (power control vector) are compared to their permissible transmit power (power-based selection criteria). A determination based upon transmission-rate fairness ($U_k \leq U$) and the power vector ($p^{(k)}$) as related to the permissible transmit power (P_{\max}) ($p^{(k)} \leq P_{\max}$) is made as to whether to implement another step increase in rate. Thus, the determination of whether to increase the rate is taught to be based upon each of (and thus a function of) a vector of transmit power ($p^{(k)}$), transmission-rate-allocation unfairness (U_k) and a power-based selection criteria (P_{\max}). While Appellant's invention need not be limited to any one embodiment, the above mentioned embodiment provides explicit support for the claim limitations relating to rate allocation being determined as a function of the recited elements. Appellant respectfully submits that the skilled artisan would understand these steps and that there is ample support in the specification.

The Vector of Transmit Powers has Explicit Support

Appellant respectfully submits that the Examiner has failed to address the substance of Appellant's remarks. The Examiner asserts that the only vector taught is a standard interference vector. Appellant's remarks have repeatedly indicated that the power vector is explicitly disclosed and further that the interference vector uses a power vector as a parameter. Applicant notes that the term "power vector" is mentioned no less than ten different times in the Appendix and further that the symbolic notation for the power vector " $p(n)$ " is also used many times therein. Moreover, the interference vector is derived from the power vector. Accordingly, the record shows that the Examiner's acknowledgement of the existence of the interference vector implies the existence of the power vector. Appellant has reproduced an example portion of the appendix for convenience:

Let $\mathbf{p}(n) \in \mathcal{R}^K$ be the received power vector and $\mathbf{i}(\mathbf{p}(n)) \in \mathcal{R}^K$ as the corresponding received interference and noise power vector for the K users in the system at the n^{th} power control iteration. Then the SINR (signal to interference and noise power ratio), $\hat{\gamma}_k(n) = \frac{p_k(n)}{i_k(\mathbf{p}(n))}$, where $p_k(n)$ is the user power and $i_k(\mathbf{p}(n))$ is the interference and noise power for the k^{th} user. The received power vector, \mathbf{p} , is considered *feasible*, if $\hat{\gamma}_k \geq \gamma_k, \forall k$, where γ_k is the desired SINR for the k^{th} user. Thus, for a feasible power vector,

This paragraph is merely one example of a number of teachings relating to a power vector $\mathbf{p}(n)$, and a cursory review of the Appendix would have revealed the numerous discussions of a power vector. The Examiner, however, improperly bases the rejection upon an assertion that the interference vector is the only vector disclosed. Appellant reiterates that the interference vector is taught to be derived from the power vector. This assertion has not been disputed nor has the Examiner addressed this assertion in any manner. Instead, the Examiner has chosen not to dispute nor respond thereto, leaving no logical rationale for the rejection. It is illogical to assert that the interference vector is the only vector disclosed when the interference vector is determined based upon the power vector. In view of the uncontroverted record, the rejection cannot be maintained and must be reversed.

The 35 U.S.C. § 103 Rejections are Improper

The Vector of Transmit Powers has Explicit Support

Appellant reiterates that the Examiner has failed to show correspondence to each claim limitation and maintains the arguments presented in the Appeal Brief. Appellant respectfully submits that the Examiner has presented only a cursory analysis of the prior art as it relates to the claimed invention. In particular, the Examiner appears to cite to numerous elements in the prior art without addressing how the elements relate to one another. For example, the transmission rates disclosed in Zehavi are taught to be responsive to the type of transmission, where active speech is coded at a full rate subject to techniques for reducing the rate without affecting the perceived quality (*see, e.g.,* Zehavi at Col. 7, lines 45-59). Thus, the rate allocation is not taught to be a function of the specific elements as found in the claim limitations.

Moreover, Zehavi teaches that the power control groups are set based upon the transmission rate rather than rate allocation being set based upon the power control groups. FIG. 4a-4e and related discussion beginning at Col. 8, line 42 of Zehavi expressly teaches that the energy levels "E" are set once the transmission rate is determined. More particularly, selection of transmission rate determines what power control group is used. Thus, Zehavi teaches that transmission rates are set based upon the type of transmission and that the transmission rates define the power control groups. As such, Zehavi does not teach that the transmission rate is a function of a power control vector. Quite the opposite, Zehavi teaches that individual power control groups (with no discussion of vectors thereof) are a direct result of the already selected transmission rates. As such, Appellant is not aware of, and the Examiner has failed to identify, any portions of Zehavi that teach selection of transmission rates as a function of the power control groups. The Examiner's rejection improperly relies upon Zehavi to teach correspondence to such limitations and the assertions of obviousness do not cure (and are not asserted to cure) this deficiency of the teachings of Zehavi.

For the reasons set forth above and those arguments set forth in the Appeal Brief, the rejections are improper and must be reversed.

Conclusion

In view of the above, Appellant maintains that the rejections of claims 1-25 are improper. Appellant therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

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Respectfully submitted,

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